

Serial Number: 09/825,273

Filed: April 3, 2001

Group Art Unit: 2878

the first polarization direction conforming to that of an extraordinary beam of the beam combining unit and the second polarization direction conforming to that of an ordinary beam of the beam combining unit:

wherein the beam combining unit and that at least one beam combining unit which combines the first light beam and the second light beam largely lossless and wherein the combination of the first and second light beams is accomplished with reference to at least one characteristic property of the first and second light beams.

Sub
b6
for
Claim 2. (Canceled)

Claim 3. (Canceled)

Claim 4. (Canceled)

Claim 5. (Canceled)

b7c
Claim 6. (Currently Amended) The apparatus as defined in Claim 1 [4], characterized in that the polarization beam splitter (11) and a Faraday rotator (17) are arranged between the two light beams (12, 13) from the two laser light sources (1, 2), wherein the light beams (12, 13) proceeding coaxially with one another in opposite directions, further comprising an optical diode.

Claim 7. (Canceled)

Claim 8. (Canceled)

Claim 9. (Canceled)

Claim 10. (Canceled)

Claim 11. (Cancelled)

b3
Claim 12. (Currently Amended) The apparatus as defined in Claim 1, characterized in that the light sources (1, 2) are pulsed laser light sources (34, 35) defining a pulse profile over time (36, 37) wherein the pulse profile over time (36, 37) is a characteristic property.

Serial Number: 09/825,273

Filed: April 3, 2001

Group Art Unit: 2878

Claim 13. (Currently Amended) The apparatus as defined in Claim 12, characterized in that the beam combining unit is configured as an acousto-optical deflector (AOD) (38) or, as an electro-optical deflector (EOD).

Claim 14. (Currently Amended) The apparatus as defined in Claim 12, characterized in that the pulses of the laser light sources (34, 35) are offset in time with respect to one another.

Claim 15. (Previously Amended) The apparatus as defined in Claim 12, characterized in that the individual light pulses are deflected, by a corresponding activation of an AOD or EOD, in the direction of a coaxially proceeding light beam.

Claim 16. (Canceled)

Claim 17. (Canceled)

Claim 18. (Currently amended) An apparatus for combining light comprising:
a first laser sources defining a first laser beam serving as a master beam;
a beam splitter for splitting the first laser beam into a second laser beam and a third laser beam, the second laser beam being coupled into a second laser source, the third laser beam being coupled into a third laser source, the second and the third beams serving to synchronize emitted light from the second and third laser sources, the emitted light being coherent and having a fixed phase relationship; and

phase modification means for modification of the fixed phase relationship of the emitted light and outputting the emitted light to reflecting means for combination. as defined in Claim 1, characterized in that a cascaded beam combination of several laser light sources (1,2,45) is provided.

Claim 19. (Canceled)

Claim 20. (Canceled)

Claim 21. (Canceled)

Claim 22. (Canceled)

Claim 23. (Canceled)

Serial Number: 09/825,273

Filed: April 3, 2001
Group Art Unit: 2878

Claim 24. (Currently Amended) An apparatus for combining light comprises:
a first light source;

means for dividing the light from the first light source into plurality of partial beams, the
light from the first light source serving to synchronize stimulated emission of a plurality of laser
light sources;

the plurality of laser light sources wherein the light of each partial beam is coupled into
one of the plurality of the laser light sources and wherein the light from the plurality of the laser
light sources is coherent and has approximately the same wavelength; and

a plurality of beam combining means which combine the light emitted from the plurality
of the laser light sources largely lossless, and wherein the combination of the light is
accomplished with reference to a characteristic property of the light.

Claim 25. (Currently Amended) The apparatus as defined in Claim 24, characterized in
that phase is provided as the characteristic property of the light is phase (30).

61
Claim 26. (Currently Amended) The apparatus as defined in Claim 24, characterized in
that wherein the plurality of the beam combining means (23) perform beam combination in
accordance with the time reversal of a beam division at an interface or at a beam splitter plate.

Claim 27. (Currently Amended) The apparatus as defined in Claim 24, characterized in
that to prevent feedback of light into a laser light source (24), further comprising an optical
diode (31) to prevent the light from reflecting back to the first light source.

68
Claim 28. (Previously Amended) The apparatus as defined in Claim 27, characterized in
that wherein the optical diode is a Faraday rotator, or as a Faraday rotator in conjunction with a
Gian-Thompson prism, or as an acousto-optical modulator (AOM), or as an optical circulator

69
Claim 29. (Currently Amended) The apparatus as defined in Claim 25, further comprising
a phase modification means (32) is placed disposed before and/or after each laser light source
(25,26,27) for matching the phase of the individual laser light sources (25, 26, 27).

Serial Number: 09/825,273

Filed: April 3, 2001

Group Art Unit: 2878

30. (Currently amended) A confocal scanning microscope (3) comprises:
at least one beam combining unit provided as a double-refracting optical element;
at least two laser light sources (1, 2) a first laser source emitting a first light beam having
a first polarization direction and a second laser source emitting a second light beam having a
second polarization direction, the first and the second light beams having approximately the
same wavelength; each of which defines a light beam (12, 13) wherein the light from the laser
light sources (1, 2) has approximately the same wavelength; and

the first polarization direction conforming to that of an extraordinary beam of the beam
combining unit and the second polarization direction conforming to that of an ordinary beam of
the beam combining unit;

wherein the beam combining unit and that at least one beam combining unit (11)
which combines the first light beam and the second light beam the light beams (12, 13) largely
lossless and wherein the combination of the first and second light beams (12, 13) is
accomplished with reference to at least one characteristic property of the first and second light
beams (12, 13).

31.(Canceled)

32.(Canceled)

33.(Canceled)

34.(Canceled)

35. (Canceled)

36. (Canceled)

Serial Number: 09/825,273

Filed: April 3, 2001

Group Art Unit: 2878

37.(Currently Amended) A confocal scanning microscope with a beam combining apparatus comprising:

a first laser sources defining a first laser beam serving as a master beam;
a beam splitter for splitting the first laser beam into a second laser beam and a third laser beam, the second laser beam being coupled into a second laser source, the third laser beam being coupled into a third laser source, the second and the third beams serving to synchronize emitted light from the second and third laser sources, the emitted light being coherent and having a fixed phase relationship; and

phase modification means for modification of the fixed phase relationship of the emitted light and outputting the emitted light to reflecting means for combination. as defined in Claim 30, characterized in that a cascaded beam combination of several laser light sources (1,2,45) is provided.

38. (Canceled)

39. (Canceled)

40.(Canceled)

41.(Canceled)